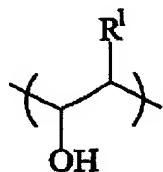


Claims:

1. Process for the production of cross-linked polyvinyl acetals, in which a polymer (A1) is cross-linked, which, relative to its total weight, contains

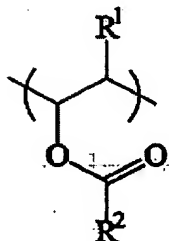
- a) 1.0 to 99.9% by weight of structural units of formula (1)



(1)

in which R¹ means hydrogen or methyl,

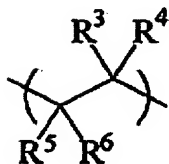
- b) 0 to 99.0% by weight of structural units of formula (2)



(2)

in which R² represents hydrogen or an alkyl radical with 1 to 6 carbon atoms,

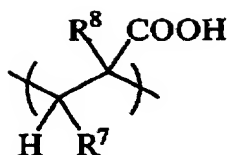
- c) 0 to 70.0% by weight of structural units of formula (3)



(3)

in which R³, R⁴, R⁵ and R⁶, in each case independently of one another, are radicals with a molecular weight in the range of 1 to 500 g/mol,

- d) 0.00001 to 30.0% by weight of structural units of formula (4)



(4)

in which R^7 and R^8 , in each case independently of one another, contain hydrogen, a carboxyl group, an alkyl group with 1 to 10 carbon atoms, which optionally can exhibit one or more COOH groups as substituents, or represents an optionally substituted aryl group with 6 to 12 carbon atoms, characterized in that in any sequence

- (i) Polymer (A1) is reacted with at least one polyaldehyde of formula (5),



in which R^9 represents a bond or a radical that has 1 to 40 carbon atoms, and n is an integer that is greater than or equal to 2,

and

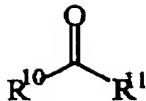
- (ii) Groups of formula (1) and formula (4) are at least partially esterified with one another.

2. Process according to at least one of the preceding claims, wherein a compound (5) with $n = 2$ or 3 is used.

3. Process according to at least one of the preceding claims, wherein a compound (5) is used, in which R^9 is an aliphatic, cycloaliphatic and/or aromatic group with 1 to 12 carbon atoms.

4. Process according to at least one of the preceding claims, wherein glutaric dialdehyde and/or n -nonanedial is used as compound (5).

5. Process according to at least one of the preceding claims, wherein at any time, at least one compound of formula (6) is added,



(6)

in which R^{10} and R^{11} , in each case independently of one another, are hydrogen, an alkyl group with 1 to 10 carbon atoms or an optionally substituted aryl group with 6 to 12 carbon atoms.

6. Process according to claim 5, wherein n-butyraldehyde is used as compound (6).

7. Process according to claim 5 and/or 6, wherein

(1) 95.00 to 99.99 parts by weight of at least one compound (6)

(2) 0.01 to 5.00 parts by weight of at least one polyaldehyde (5)

are used, whereby the indicated parts by weight are supplemented up to 100.00 parts by weight.

8. Process according to at least one of the preceding claims, wherein esterification (ii), optionally in the presence of at least one softener, is performed at mass temperatures in the range of 80 to 280°C.

9. Process according to claim 8, wherein the cross-linking is performed in an extruder, a kneading aggregate or another heatable aggregate.

10. Cross-linked polyvinyl acetal that can be obtained by a process according to at least one of the preceding claims.

11. Polyvinyl acetal according to claim 10, wherein its total content of esterified and non-esterified carboxyl groups is less than or equal to 10.0% by weight, relative to the total weight of the polyvinyl acetal.

12. Polyvinyl acetal according to claim 10 and/or 11, wherein it contains a softener.
13. Molding compound that contains a polyvinyl acetal according to at least one of claims 10 to 12.
14. Film that contains a polyvinyl acetal according to at least one of claims 10 to 12.
15. Use of a film according to claim 14 for the production of laminated safety glasses.
16. Coating that contains a polyvinyl acetal according to at least one of claims 10 to 12.
17. Use of a polyvinyl acetal according to at least one of claims 10 to 12 for the production of ion-conductive intermediate layers for eletrochromic systems.